ALGEBRA

C – 3

18. If $(a - \frac{1}{a}) = 6$ then $(a^4 + \frac{1}{a^4}) = ?$

(A) 34
(B) 1444
(C) 38
(D) 1442

RRB Group-D 2018

$x + \frac{1}{x} = 3$

$x^2 + \frac{1}{x^2} = 7$

$x^4 + \frac{1}{x^4} = 47$

$a^2 + \frac{1}{a^2} = (6)^2 + 2 = 38$

$\Rightarrow a^4 + \frac{1}{a^4} = (38)^2 - 2$

$= 1444 - 2$

$= 1442$ Ans

19. If $p - \frac{1}{p} = 6$ *the what is the value of* $p^4 + \frac{1}{p^4}$?

(A) 1562

(B) 1432

(C) 1442 ✓

(D) 1444

SSC CGL 2022

20. If $x - \frac{1}{x} = 2\sqrt{2}$ *what is the value of* $(x^6 + \frac{1}{x^6})$?

(A) 1030

(B) 960

(C) 1000

(D) 970

SSC CGL 2023

$x^2 + \frac{1}{x^2} = (2\sqrt{2})^2 + 2$

$= 10$

$\left(x^2 + \frac{1}{x^2}\right)^3 = (10)^3$

$= x^6 + \frac{1}{x^6} + 3 \times 10 = 1000$

$\Rightarrow x^6 + \frac{1}{x^6} = 970$

21. If $(x - \frac{1}{x} = 4)$ then what is the value of $(x^6 + \frac{1}{x^6})$?

(A) 4689
(B) 4786
(C) 5832
(D) 5778

SSC CHSL 2023

$$\left(x^2 + \frac{1}{x^2}\right)^3 = (18)^3$$

$$\Rightarrow x^6 + \frac{1}{x^6} + 54 = 5832$$

$$x^6 + \frac{1}{x^6} = 5778$$

$$x+\frac{1}{x}=2$$

$$x^2+\frac{1}{x^2}=?$$

$$x^3+\frac{1}{x^3}=?$$

$$x^4+\frac{1}{x^4}=?$$

$$x^8+\frac{1}{x^8}=?$$

$$x^5+\frac{1}{x^5}=?$$

$$x-\frac{1}{x}=3$$

- $x^2+\frac{1}{x^2}=?$
- $x^3-\frac{1}{x^3}=?$
- $x^4+\frac{1}{x^4}=?$
- $x^5-\frac{1}{x^5}=?$
- $x^6+\frac{1}{x^6}=?$
- $x^7-\frac{1}{x^7}=?$

$$x^8+\frac{1}{x^8}=?$$

22. If $(x - \frac{1}{x} = 3)$ then what is the value of $(x^5 - \frac{1}{x^5})$?

(A) 393
(B) 363
(C) 383
(D) 322

SSC CHSL 2023

$$x^5 - \frac{1}{x^5}$$

$$= \left(x^2 + \frac{1}{x^2}\right)\left(x^3 - \frac{1}{x^3}\right) - \left(x - \frac{1}{x}\right)$$

$$= 11 \times 36 - 3$$

$$= 396 - 3 = 393$$

23. $\sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{6}$ then $x^2 + \frac{1}{x^2}$ is equal to :

(A) 62 (B) 14

(C) 16 (D) 36

SSC CGL 2019

$$x + \frac{1}{x} = (\sqrt{6})^2 - 2$$

$$= 4$$

$$x^2 + \frac{1}{x^2} = (4)^2 - 2 = 14$$

24. If x^2 - 4X + 1 = 0 what is the value $x^2+\frac{1}{x^2}$?

(A) 14 (B) 15
(C) 18 (D) 16

RRB NTPC 2021

$x^2 - 4x + 1 = 0$

$\Rightarrow \frac{x^2}{x} - \frac{4x}{x} + \frac{1}{x} = 0$

$\Rightarrow x - 4 + \frac{1}{x} = 0$

$\Rightarrow x + \frac{1}{x} = 4$

25. If x satisfies the equation $x^2 - 2X + 1 = 0$ *then the value of* $x^3 - \frac{1}{x^3}$ is :

(A) 1 (B) -1

(C) 0 (D) $\frac{1}{3}$

RRB NTPC 2020

$x^2 - 2x + 1 = 0$

$\Rightarrow x + \frac{1}{x} = 2$

$x = 1$

$x^3 - \frac{1}{x^3}$

$1^3 - \frac{1}{1^3} = 1 - 1 = 0$

26. If $x + \frac{1}{x} = 5$ then find the value of $\frac{3x}{2x^2+2-5x} = ?$

(A) $\frac{5}{3}$ (B) $\frac{3}{5}$

(C) $\frac{2}{3}$ (D) $\frac{2}{5}$

RRB NTPC 2021

$$\frac{3x}{2x^2+2-5x}$$

$$= \frac{3}{2x+\frac{2}{x}-5}$$

$$= \frac{3}{2\left(x+\frac{1}{x}\right)-5} = \frac{3}{2\times5-5} = \frac{3}{5}$$

A

27. If $\frac{x^2+1}{x} = 5$ then find the value of $x^4 + \frac{1}{x^4} - 36$

(A) 491
(B) 149
(C) 419
(D) 194

SSC CHSL 2023

$\frac{x^2+1}{x} = 5$

$\Rightarrow x^2+1 = 5x$

$\Rightarrow x^2 - 5x + 1 = 0$

$\Rightarrow x + \frac{1}{x} = 5$

$x^2 + \frac{1}{x^2} = 23$

$x^4 + \frac{1}{x^4} = 527$

$x^4 + \frac{1}{x^4} - 36$

$= 527 - 36$

$= 491$ ✓

28. If x^2-7x+1=0 and 0 < x < 1, what is the value of $x^2 - \frac{1}{x^2}$?

(A) $21\sqrt{5}$ (B) $-21\sqrt{5}$

(C) $28\sqrt{5}$ (D) $-28\sqrt{5}$

SSC CGL 2023

$$x^2 - 7x + 1 = 0$$

$$x + \frac{1}{x} = 7$$

$$\left(x - \frac{1}{x}\right)^2 = \left(x + \frac{1}{x}\right)^2 - 4 \cdot x \cdot \frac{1}{x} = (7)^2 - 4 = 45$$

$$x - \frac{1}{x} = \pm\sqrt{45} = \pm\sqrt{3 \times 3 \times 5} = \pm 3\sqrt{5}$$

$$\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right) = (7)(-3\sqrt{5}) = -21\sqrt{5}$$

29. If $x - \frac{1}{x} = 1$, then what is the value of $x^8 + \frac{1}{x^8}$?

(A) 3
(B) 119
(C) 47
(D) -1

SSC CGL 2021

30. If $\frac{6x}{2x^2+5x-2} = 1$, $x > 0$ then the value of $x^3 + \frac{1}{x^3}$ is:

(A) $\frac{3}{8}\sqrt{17}$ (B) $\frac{5}{8}\sqrt{17}$

(C) $\frac{5}{16}\sqrt{17}$ (D) $\frac{3}{4}\sqrt{17}$

SSC CHSL 2019